

IBM Institute for Knowledge-Based Organizations



An Introduction to Social Network Analysis

Andrew Parker

IBM Institute for Knowledge-Based Organizations



Agenda

❖ Why Social Network Analysis (SNA) Is Important

Using SNA to Promote Collaboration in Organizations

Improving Social Networks

What exactly are Social Networks and why should we focus our attention on them?

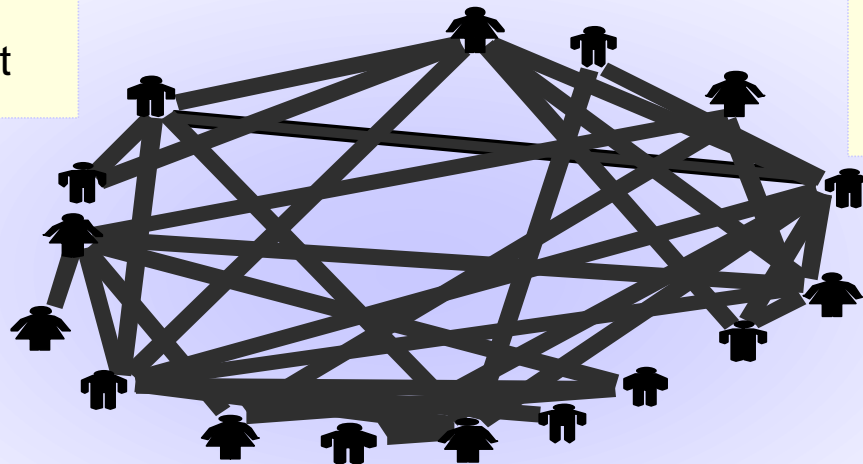
Key Reasons Why Social Networks Are Important

Where Work Happens

- Lack of boundaries
- Informal networks increasingly important

Where People Engage

- Join and commit to people
- Trust accrues in networks of relations



Where Knowledge Lives

- Rely on people for information
- People can provide more than databases

BUT...

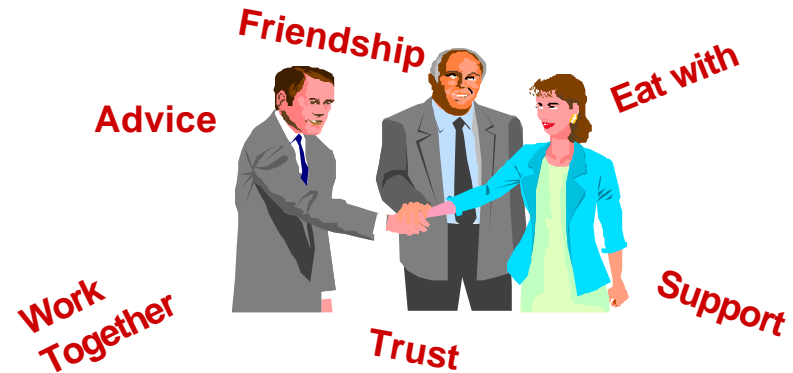
- Invisible
- At odds with formal structure

Relationships and network structure, the building blocks of social network analysis, directly impact an organization's effectiveness

Building Blocks of Social Network Analysis

- **Relationships are:**

- The basic elements of network structure
- Multi-dimensional
- 'Discovered' through the questions we ask

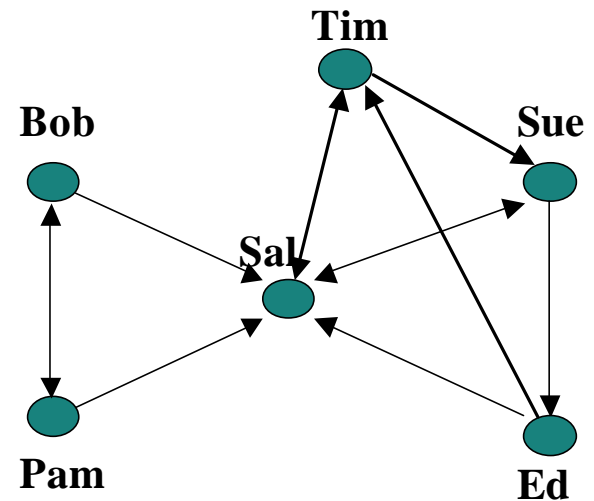


- **Network Structure** can facilitate or impede organizational effectiveness

- Are certain people overly central?
- Are some people loosely connected and under-utilized?
- Are there divisive subgroups?
- Is the network's level of connection sufficient?

- **Social Network Analysis** can help identify:

- Structure of a community
- Key people and their roles in the community
- People who are not well connected to the community



So far, our research has focused on finding and analyzing social networks in their current states; in the future, we will focus on how to improve social networks

Social Network Analysis Research Methodology

Research Methodology:

- Goal: To determine how organizations can better support work occurring in and through informal networks of employees
- Source: forty-five informal networks in thirty different Fortune 500 companies and government agencies
- Time Period: Conducted study over a three year period
- Techniques: Included surveying a large majority of the members of each network and interviewing a selection of members across hierarchical levels

Finding Social Networks

Our research to date:

- Collaboration Within and Across Organizational Boundaries
 - Characteristics of Relationships Facilitating Knowledge Creation
 - Knowledge Flow in Human Networks
- Communities of Practice
- Work Based Relationships

Improving Social Networks

Our focus for the future:

- Individual Network Interventions
- Bounded Network Interventions
- Organizational Design and Social Networks

Applying SNA can help fully leverage the working relationships people develop to share their knowledge

Where SNA Has Proven Useful

Applications for SNA

Facilitating collaboration within strategically important groups (NPSP teams, research teams, etc.)

Improving integration following strategic change initiatives (organizational restructuring, M&A, etc.)

Supporting critical junctures in networks that cross, and often breakdown across, functional, hierarchical, geographical, or organizational boundaries

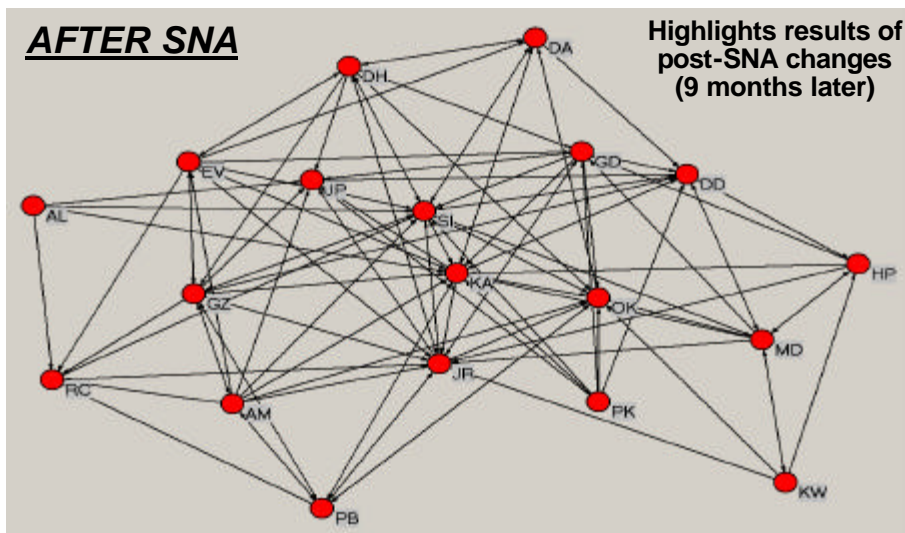
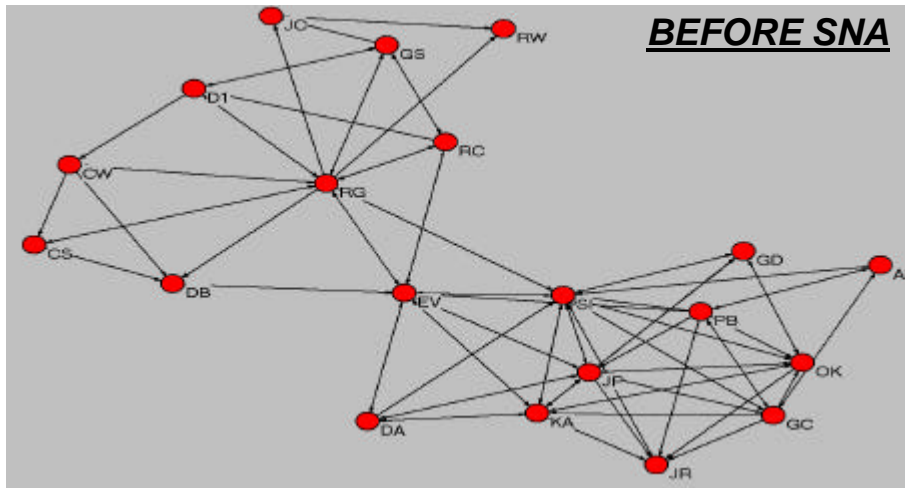
How SNA Helps

- Identifies strength of ties within important groups such as finance teams, research and development groups, and strategic business units
- Helps determine where to promote and facilitate collaboration and knowledge sharing
- Helps identify short falls in the integration of networks following a restructuring or other strategic change initiative
- Determines where change initiatives have impaired the effectiveness of established networks while at the same time doing little to aid the development of new networks
- Provides insights into existence and lack of collaborative behavior across boundaries
- Identifies which boundaries are invisible barriers to sharing of information and where management should focus integration efforts



SNA makes visible patterns of information sharing within strategically important formal and informal networks.

Many of the benefits of SNA become apparent when comparing before and after diagrams of relationships within an organization



After completing the SNA

- **Conducted a lengthy, facilitated session with managers and executives**
 - Showed SNA diagrams with names, which sparked a frank discussion on whose expertise was not being tapped and who was a bottleneck
 - From this emerged greater self-understanding, the will to change, and set of interventions
- **Implemented changes that led to improved integration of social networks**
 - Staffed internal projects with members of each group
 - Introduced mixed revenue sales goals with managers accountable for selling projects with both kinds of expertise
 - Developed new communication forums including project tracking database and weekly email updates
 - Made personnel changes to remove a bottleneck; transferred this person to another group

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Why Social Network Analysis (SNA) Is Important

••✦ Using SNA to Promote Collaboration in Organizations

Improving Social Networks

Improving collaboration and information sharing can benefit cross functional teams

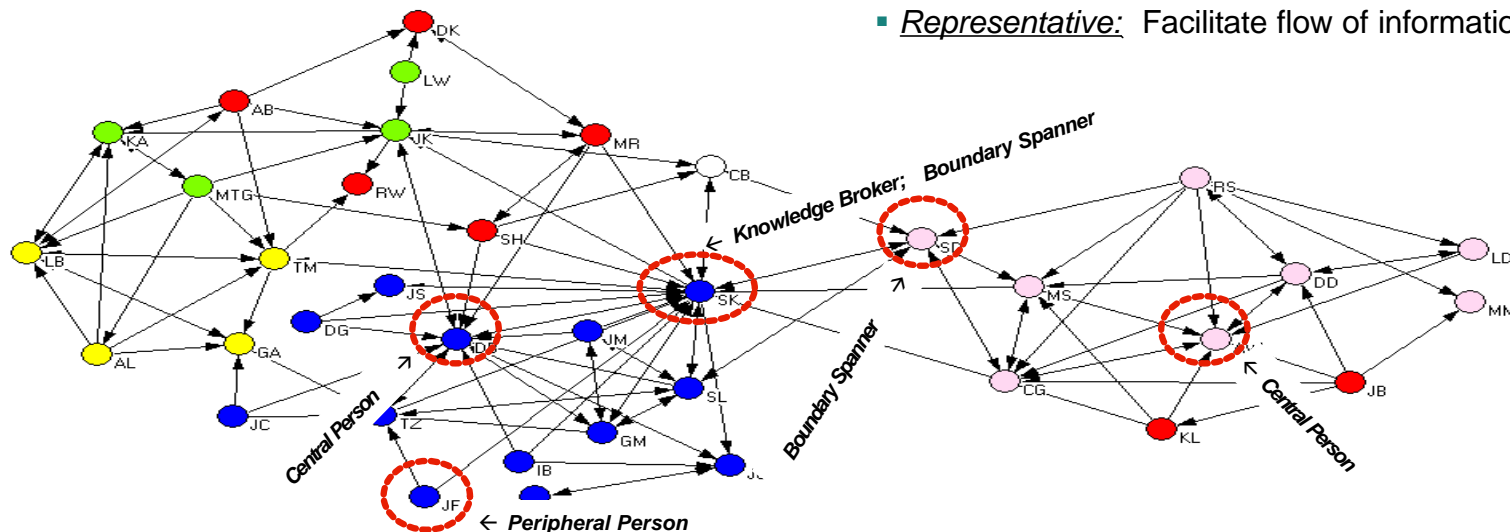
Key Questions

- Does information flow smoothly within informal networks (e.g., Do team members communicate with each other regularly? Do teams share information and learning's from past experiences?)?
- Do certain functional departments or business units tend to collaborate better than other groups in taking their services to market, or is degree of collaboration dependent upon the individuals within the group?
- What conditions, when present among team members, facilitate knowledge sharing and relationship building?
- How does knowledge flow in human networks?
 - What can be done to improve knowledge flow?
 - Are there aspects of relationships which are either impeding or facilitating information flow within networks?
- How can we build communities of practice within our organizations?
 - How can we ensure that the collective expertise resident in a network is effectively leveraged?

Identifying the different roles individuals play in information flow is an important first step in understanding the effectiveness of a network

Possible Roles That Individuals May Be Playing

- **Central people**
 - Hold the network together
 - Are an important source of expertise
 - May become bottlenecks; holding entire network back
- **Peripheral people**
 - Are underutilized resources
 - Feel isolated from the network
 - Have a higher likelihood of leaving the company
- **Knowledge brokers**
 - Are critical connectors between diverse information sources and specific kinds of expertise
 - Keep group from fragmenting, but may become bottlenecks
- **Boundary spanners**
 - Affect information flow across boundaries (e.g., cross functional, hierarchical, geographical, or organizational)
 - Are broken down into types of boundary spanners
 - Gatekeeper: Control flow of information coming into group
 - Representative: Facilitate flow of information leaving group



SNA can pinpoint cross boundary breakdowns in information flow and collaboration

Breakdowns Across Boundaries

- Breakdowns in information flow and collaboration occur most often at one of these common boundaries:

Functional: Breakdowns between divisions (e.g., marketing and finance)

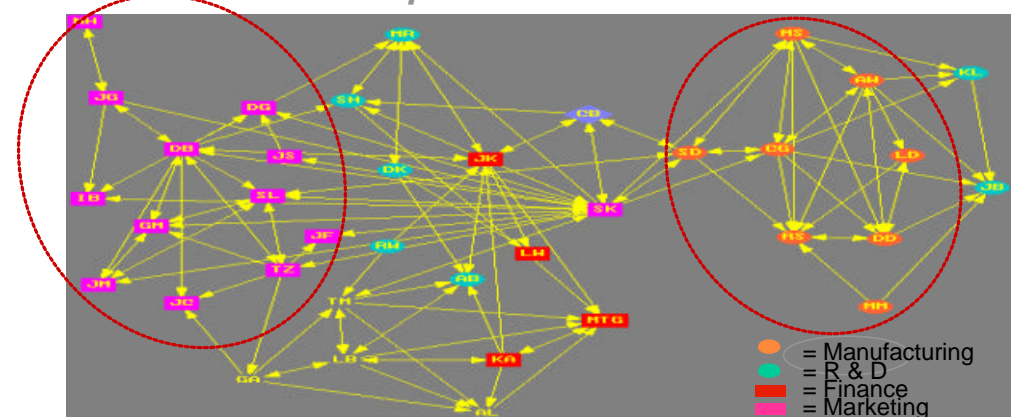
Geographical: Breakdowns between geographically separated locations (e.g., US and European offices, East Coast and West Coast offices)

Hierarchical: Breakdowns between employees of different levels (e.g., executives and junior managers)

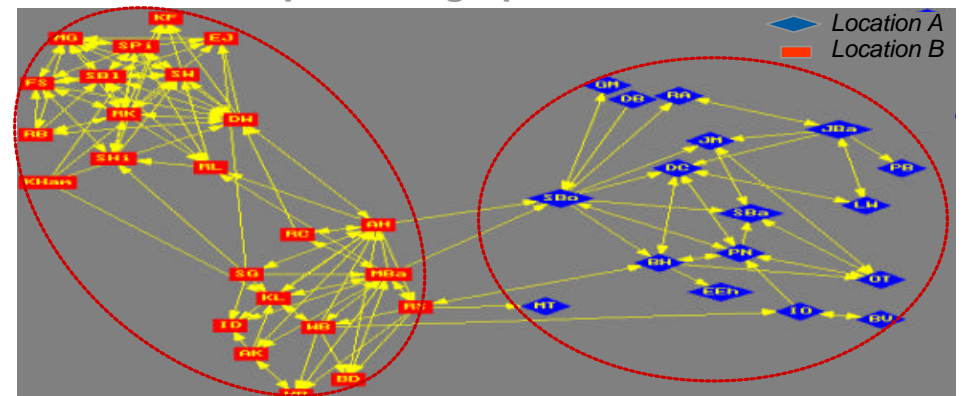
Tenure: Breakdowns between long time employees and new employees

Organizational: Breakdowns because of M&A scenarios, on NPSP teams, or among leadership networks

Case Example: Functional Boundaries



Case Example: Geographical Boundaries

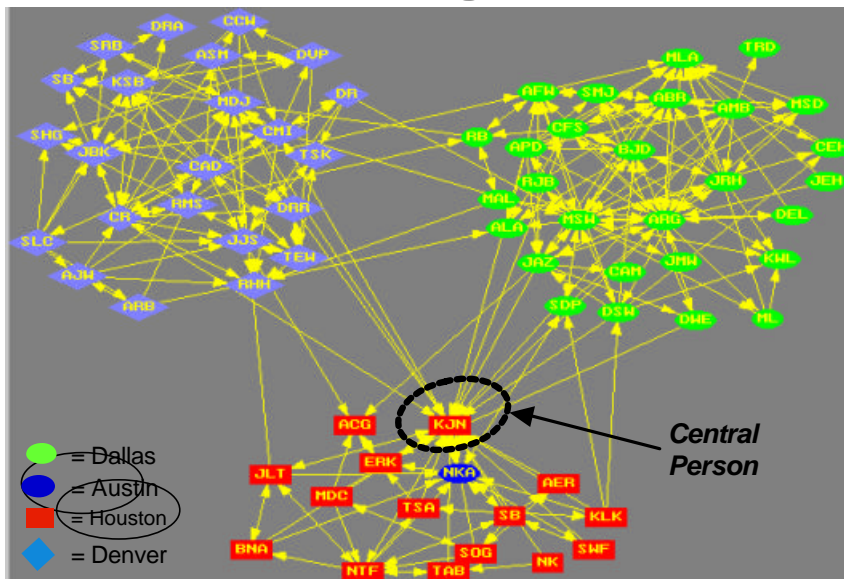


For comparative purposes, researchers asked respondents about the flow of information.

Case Examples: SNA of information flow across geographical and functional boundaries highlights lack of collaboration

SNA of Boundary Breakdowns: Two Examples

Geographical Analysis of a Consulting Firm



- SNA revealed breakdowns in communication and information sharing
 - Sparse network
 - Little information sharing between the locations
 - KJN plays a very central role in information sharing

Functional Analysis of Divisions of a Commercial Bank

	Real Estate	Commercial	Finance	Risk Mng.
Real Estate	69%	20%	51%	28%
Commercial	22%	48%	58%	30%
Finance	40%	51%	80%	67%
Risk Mng.	43%	67%	87%	90%

Percentages indicate the amount of information flow between divisions.

- SNA revealed several areas of **poor** integration among the four functional divisions
 - Between Real Estate and Commercial
 - Between Risk Management and both Real Estate and Commercial

Four dimensions of relationships are good predictors of who become information hubs within networks: Knowing, Access, Engagement, and Safety

Four Dimensions of Relationships

Despite easy access to world class knowledge management systems and other informational sources, many studies reveal that employees get a large percentage of project critical information from their personal networks.

Four dimensions of personal relationships typically determine from whom knowledge is sought

1. **Knowing:** Knowing another person's expertise and thus when to turn to them
 - Knowledge of expertise is a precursor to seeking a specific person when faced with a problem
2. **Access (both social and technical):** Being able to gain timely access to a person
 - Influenced by closeness of one's relationship, physical proximity, organization design, and collaborative technology
3. **Engagement:** Willingness of person sought out to engage in problem solving
 - Rather than an information dump, engaging people first understand the problem as experienced by the seeker and then shape their knowledge to address the seeker's problem
4. **Safety:** Safety and trust in the relationship is needed to promote learning and creativity
 - Being able to admit a lack of knowledge or to diverge in a conversation often maximizes learning and creativity



These four relational dimensions impact information flow and amount of collaboration.

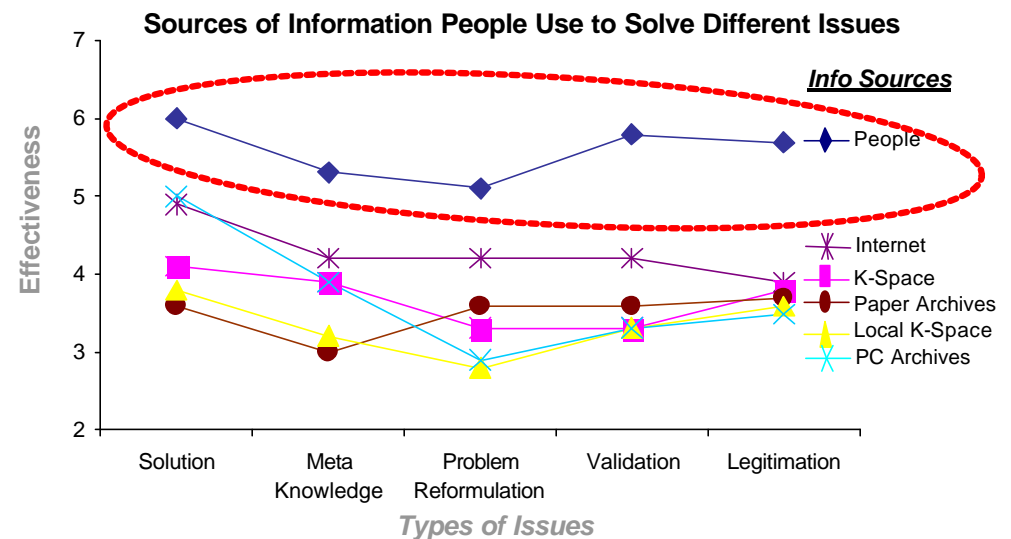
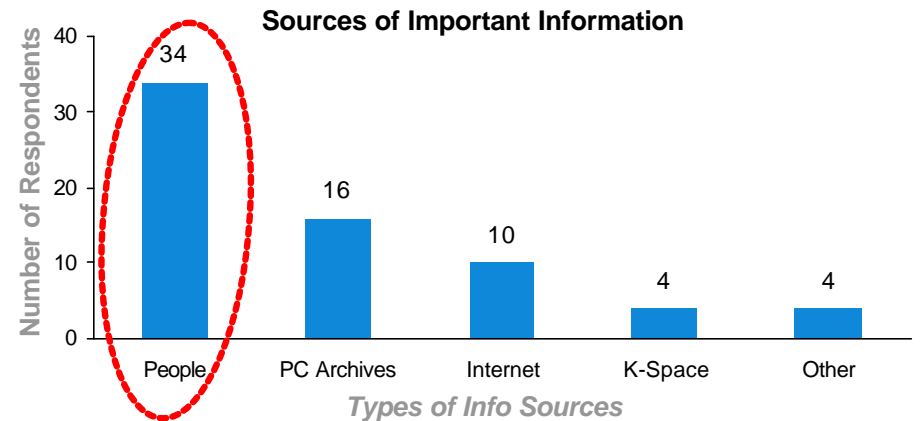
Studies show that, regardless of the issue on hand, employees view other people as the most important source of information

Sources of Information

Key Findings

- People seek project critical information from other people far more frequently than from impersonal sources (e.g., PC-Archives, Internet, etc.)
 - MIT study found scientists are five times as likely to turn to people for information than to impersonal sources
 - Impersonal sources of information are leveraged *after* having obtained information from colleagues

- People seek information from other people regardless of the issue
 - **Solutions:** Sometimes the person sought is able to answer the question directly
 - **Meta-Knowledge:** Often person sought will direct to other databases or people who have the answer
 - **Problem Reformulation:** Often interactions with others help seeker frame the problem(s) at hand
 - **Validation:** Sometimes speaking with someone else is valuable to validate plans, ideas, or thinking
 - **Legitimation:** Occasionally, speaking to others offers benefit by virtue of being able to name drop



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Why Social Network Analysis (SNA) Is Important

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❖ **Improving Social Networks**

Once strategic networks are identified, managers can improve social networks by focusing efforts on three levels; the organizational, group, and personal levels

Key Questions: Intervening to Improve Social Networks

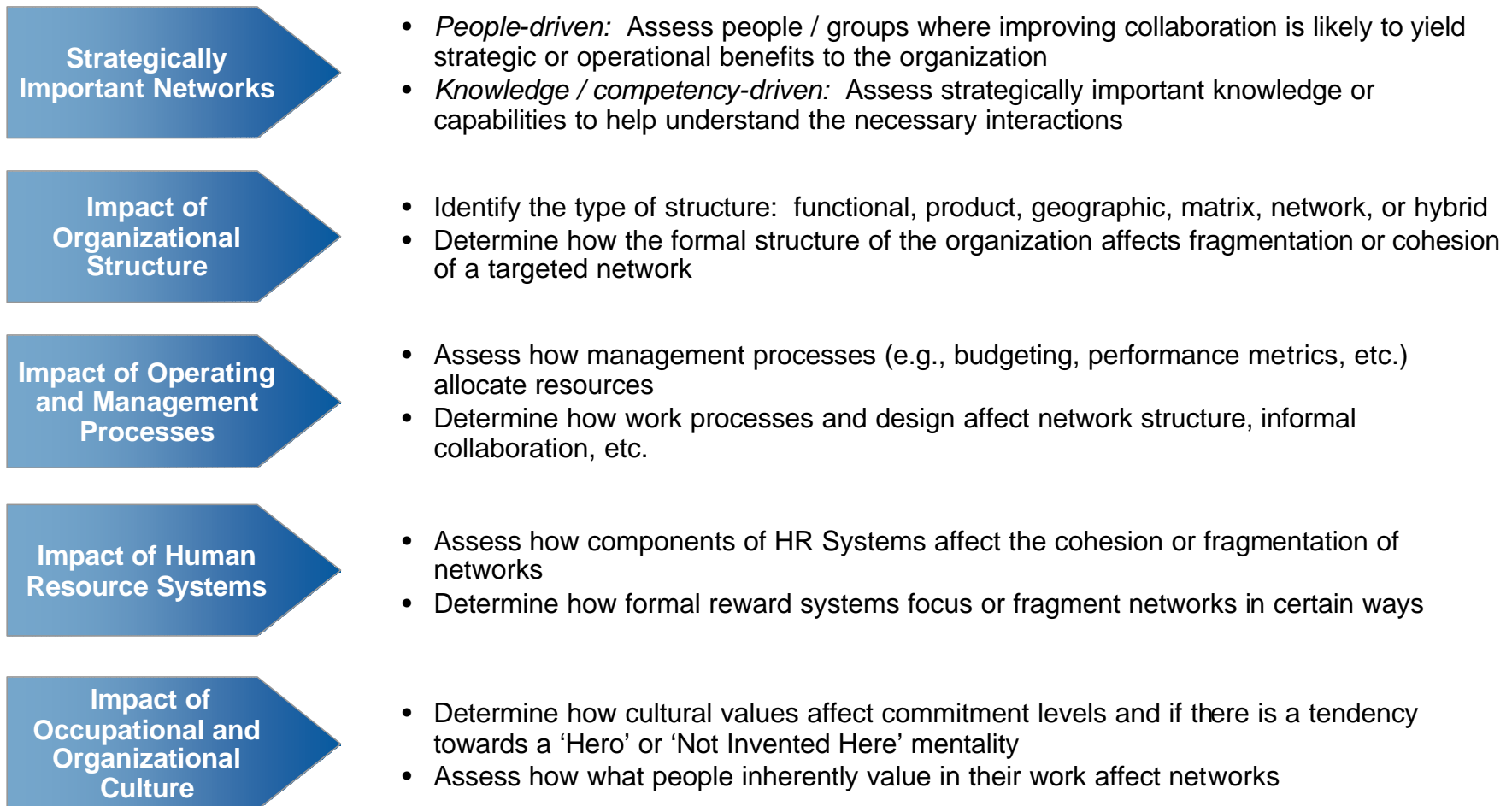
- What can managers do to improve social networks?
 - What social interventions can be used to develop, maintain, or repair relationships?
 - What collaborative technologies can aid networks?
- 1. **Organizational:** How does organizational context both focus and fragment a given network?
 - How does organizational design affect social networks?
 - How does management or leadership affect social networks?
- 2. **Group Level:** How can social network analysis be used to better support virtual work and communities?
 - How do virtual work relationships form?
 - How can SNA be used to facilitate virtual work?
- 3. **Personal Networks:** How can we analyze and improve employees' personal networks?
 - Can we assess strengths and weaknesses of connections from a knowledge and learning perspective?
 - Can we develop individual strategies for improving individual networks?



SNA offers managers and executives the visibility needed to understand how best to improve social networks in their organization.

When it comes to improving social networks at the organizational level, the key is understanding which networks are most strategic

Organizational Level: SNA and Organizational Context

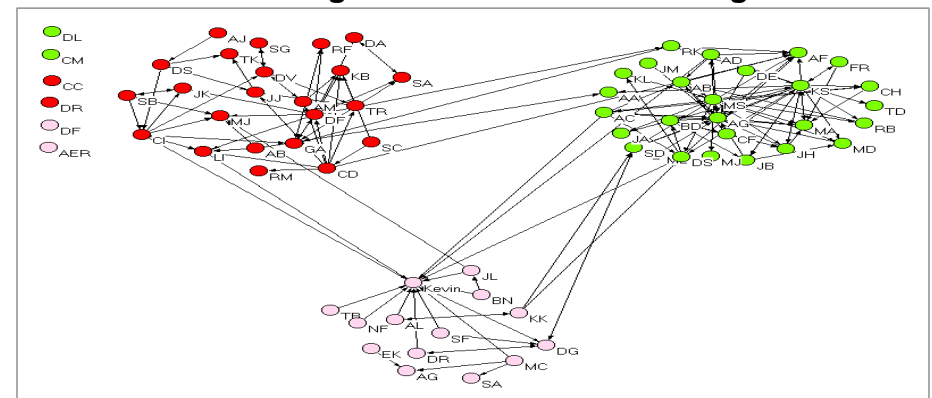


Case Example: Examining the integration of regional networks reveals how organizational context impacts social networks

How Organizational Context Impacted Social Networks During Efforts to Regionalize Offices

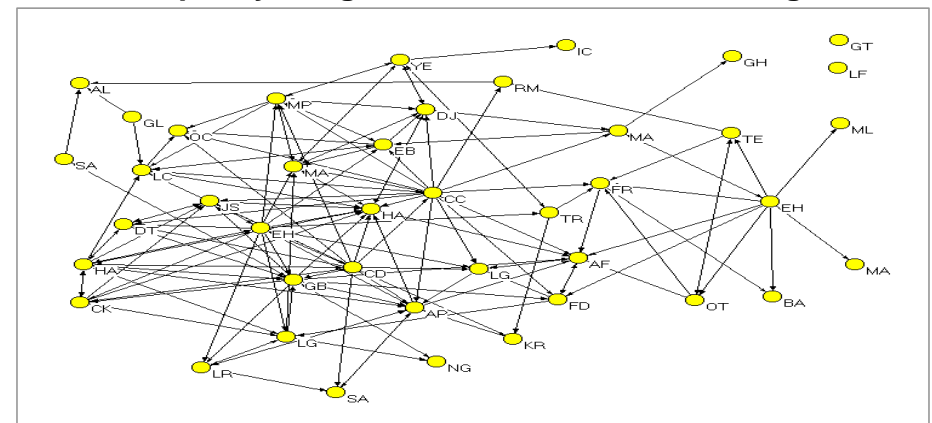
- A Big Five consulting firm desired to make a strategic shift from a local, office-based structure to a regional practice
 - Regionalization was critical to compete, BUT people were hired on the basis of a local office structure with no travel
- Eighteen months into process of changing from a local, office-based model to a regional practice, conducted SNA
- Assessed information sharing across offices in two regions
 - Despite alignment of formal structure, found sharing different significantly between the two regions
- Why was the Mid-Atlantic region able to reorganize and integrate regionally more successfully than the Southern?
 - Projects were staffed with people from different locations
 - Concentrated on establishing relationships and awareness of expertise instead of on efficiency and billable hours
 - Interpreted HR policies differently
 - Recognition of collaborative behavior rather than “rainmakers”
 - New hires taken to lunch with a cross sectional group
 - Created a peer feedback process
 - Leadership believed and modeled behavior supporting integration

Lack of Integration in the Southern Region



Sparse network with little information sharing among locations.

Exemplarily Integration in the Mid-Atlantic Region



Well connected network across 3 cities in the mid-Atlantic region.

SNA enables improvements by making visible issues that affect social networks, for example, who interacts with whom

Improving Social Networks

Goal of Intervention

Example Applicable Issue(s)

Examples of Possible Interventions

Initiating Relations



- **Boundaries create several distinct subgroups within one network**

- Staff project with people from each subgroup
- Implement metrics which promote teaming (e.g., sales goals that include combined offerings from each subgroup)
- Create new communication forums to keep subgroups in touch with each other (e.g., status calls, e-mail updates, project tracking databases)

Developing and Maintaining Relations



- **Relationship building is not part of a company's culture**

- Create internal projects and staff them with people who do not typically work together
- Schedule a special or recurring social gathering or "mixer"

Repairing Relations



- **Highly central people are bottlenecks**
- **Expertise of peripheral people is not leveraged**

- Relocate informational domains away from highly central people
- Reallocate decision making rights to people other than the most central ones
- Create ways to engage the under utilized, loosely connected people

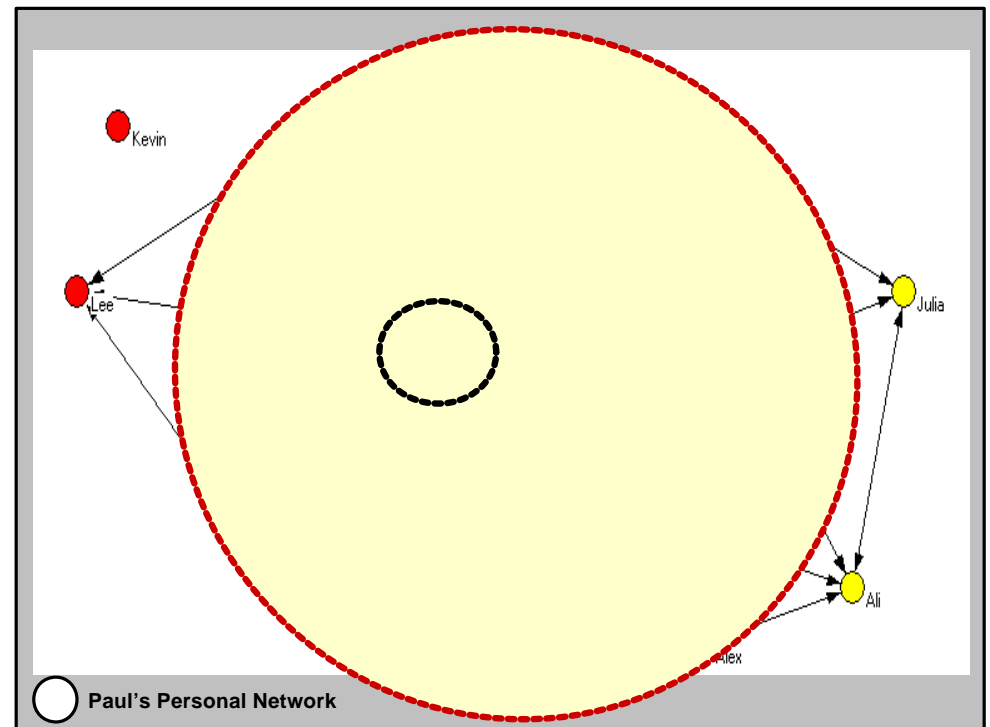
Personal networks are important both personally and professionally; your network impacts your learning, success, and satisfaction

Personal Networks

Why are personal networks important?

1. Important for personal and professional success and advancement
 - Identify job openings
 - Offer awareness of potential customers and funding
2. Important for satisfaction and well-being
 - Help improve job satisfaction
 - Help improve happiness, health, and longevity
3. Important resource for information and learning to do our work
 - Access to critical information; 85% of information critically affecting work comes through other people
 - Facilitate efficient finding of information; people are more important sources of information than all other non-personal sources of information

Example: Paul's Personal Network

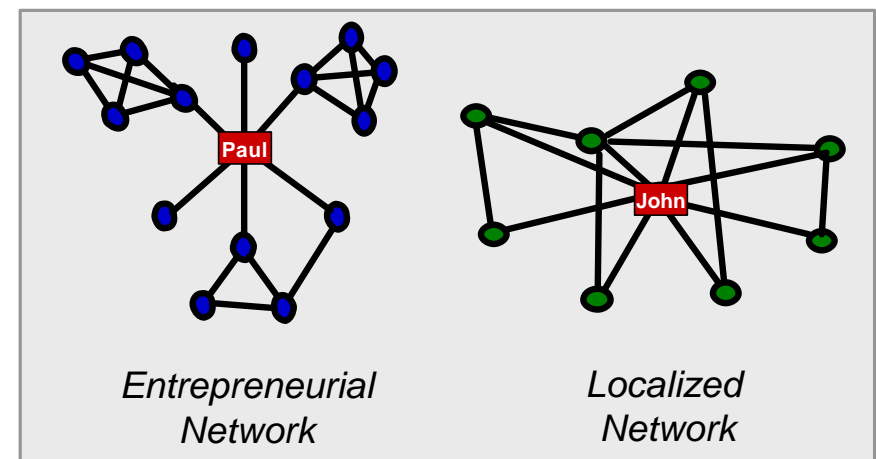
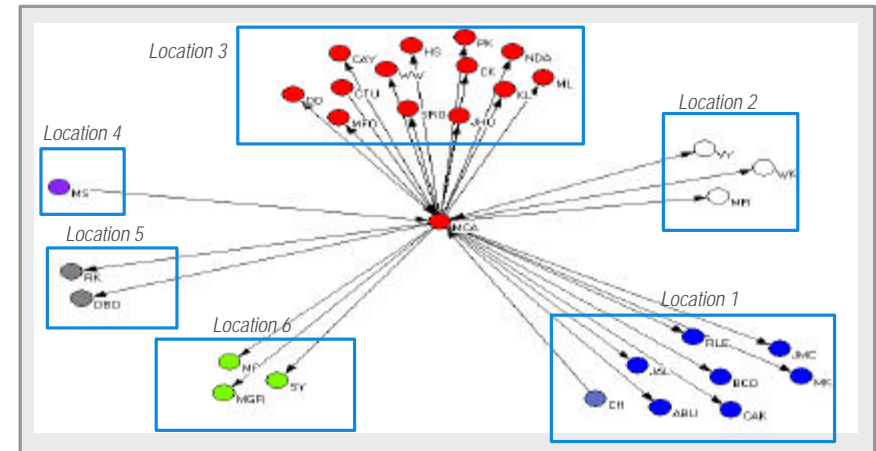


❖ **People rely on people to get their work done; the more efficient their networks, the more effective they are at getting their jobs done.**

The composition of your personal network can facilitate or constrain your access to information

Personal Network Composition

- Often there are biases in personal networks
 - Your network is biased if you rely too heavily on a certain kind of person
- Bounded networks artificially impose restrictions on those with whom we identify, however, important relationships come from all walks of our lives
 - To whom do central people in a network turn?
 - To whom do peripheral people turn?
- It is critical to understand the diversity of your network
 - Entrepreneurial network: Many people in your network don't know each other
 - Localized network: Most people in your network are aware of each other

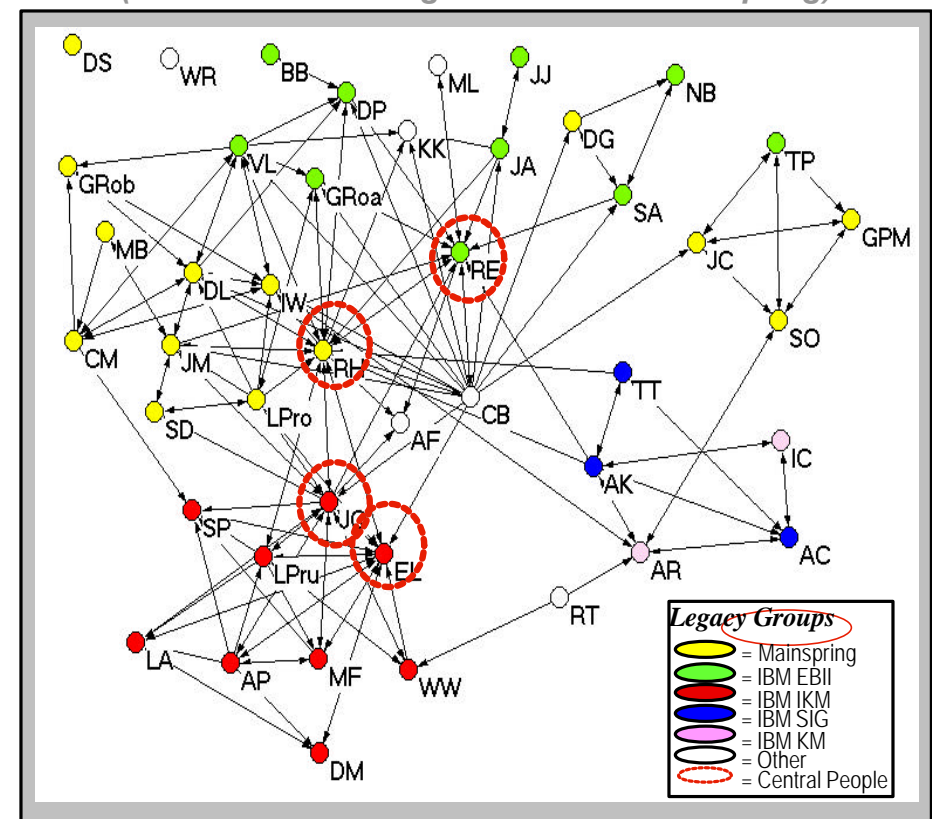


Case Example: SNA following the IBM/Mainspring merger helped managers determine how to integrate unconnected social networks

Applying SNA Learning's to Create Linkages

- Mergers and acquisitions present the challenge of not only integrating distinct cultures, but also joining previously unconnected, social networks
- Interventions are required to facilitate integration: Culture is created and shared through interactions and social ties; the most effective interventions create linkages
 - **Leveraging individual social capital:** Identify central individuals in each group and implement interventions among central people to create linkages and change attitudes
 - **Leveraging group social capital:** Identify natural clusters of mutually influencing individuals and implement interventions with clusters rather than individuals
- In the months following the SNA, interventions have resulted in the IBM IBV groups becoming more integrated

SNA of IBM IBV Team Integration
(5 Months After Merger of IBM and Mainspring)



Question: "Please indicate the extent to which the people listed below provide you with information you use to accomplish your work." Diagram includes respondents indicating "frequently" or "very frequently."

SNA helps managers and executives develop cohesive networks that enhance information flow across organizations

Summary: Benefits of Social Network Analysis

- Helps managers develop an accurate understanding of how collaborative work is occurring
- Creates an understanding of how formal organizational structure and other design decisions both fragment networks and shape what an organization learns over time
- Provides an effective tool to assess group integration after a reorganization, merger, or acquisition
- Improves knowledge sharing and information flow on cross functional teams
- Promotes organizational change by creating common awareness of network problems
- Helps to systematically identify central people or critical information brokers within a network
- Helps to identify peripheral people that need to be brought into a network to share expertise with the group
- Improves an organization's efficiency by enabling the rapid location of knowledge across the organization